

REMARKS

This Amendment is responsive to the Office Action dated June 19, 2007. Applicant has amended claims 1, 9, 11, 16-20, 24, 26, 29, 38, and 40-41, cancelled claim 25, and added new dependent claims 42-45. As a result, claims 1-24 and 26-45 are now pending.

Information Disclosure Statement

Applicant acknowledges the Examiner's remarks that the information disclosure statements (IDS's) submitted on 9/27/2004 and 3/24/2005 are in compliance with the provisions of 37 CFR 1.97. Applicant thanks Examiner for considering these submitted IDS's.

Regarding the IDS submitted on 9/27/2004, Applicant acknowledges and agrees with the Examiner's modification to the date of publication of reference number 43. Applicant also acknowledges and agrees with the Examiner's deletion of reference number 31, as it is duplicative of reference number 3. However, regarding reference number 21, the Examiner has specified a modified publication date of April, 2001. Applicant believes that the date of publication for this reference number 21, however, is more generically identified as Quarter 2 (Q2) of 2001 (J.R. Foerster et al., "Ultra-Wideband Technology for Short- or Medium-Range Wireless Communications," Ultra-Wideband Technology for Short- or Medium-Range Wireless Communications, pp. 1-11, Q2 2001).

Regarding the IDS submitted on 3/24/2005, Applicant acknowledges the Examiner's statement regarding modification to the date of publication of reference number 65. Applicant notes, however, that the Examiner did not appear to modify the date listed for reference number 65. Applicant submits that reference number 65 was published between October 11-14, 1993, and believes that the Examiner intended, but accidentally forgot, to annotate reference number 65 with this publication date, in view of the Examiner's corresponding modification to the publication date of this same reference in pending application 10/796,563. Applicant respectfully requests confirmation from the Examiner.

Lastly, regarding the IDS submitted on 3/24/2005, Applicant acknowledges that the Examiner has not considered reference number 82 because it does not specify a date in the IDS (P. Withington, "Impulse Radio Overview," Time Domain Corp., pp. 1-7). Applicant will re-submit this reference number 82 with a supplemental IDS to accompany the present response.

Objections to the Drawings

The Examiner objected to Figures 12-17 as unreadable, and requested that new figures be provided. Applicant has amended and included replacement sheets for Figures 12-17, as requests withdrawal of this objection.

The Examiner has further objected to the drawings either because they include certain reference character(s) not mentioned in the description, or because they do not include certain reference character(s) mentioned in the specification. Applicant has amended and included replacement sheets for Figures 4 and 6-9 to address the Examiner's objections. Specifically, Applicant has made the following amendments to these figures:

- In FIG. 4, Applicant has changed reference character "35" to "33";
- In FIG. 6-8, Applicant has changed reference character "54" to "52", and has changed each of the reference characters "52A", "52B", "52C", "52D", and "52E" to "54A", "54B", "54C", "54D", and "54E", accordingly.
- In FIG. 9, Applicant has changed reference character "65" to "67".

In addition, Applicant has amended paragraph [0066] of the Applicant. As a result, Applicant requests withdrawal of these objections to the drawings.

Objections to the Specification

The Examiner objected to the abstract of the disclosure as exceeding 150 words in length. Applicant has amended the abstract to reduce the word count below the 150-word limit, but has not introduced any new matter. Applicant therefore requests withdrawal of this objection.

The Examiner further objected paragraphs [0025], [0026], and [0049] in the specification. Applicant has amended each of these paragraphs to overcome the objections, but has not introduced any new matter. Applicant therefore requests withdrawal of these objections, as well.

Objections to the Claims

The Examiner objected to claim 17 as being improperly constructed. Applicant has amended claim 17 and requests withdrawal of this objection.

The Examiner further objected to claims 18, 29, and 38 as failing to further limit the subject matter of a previous claim. Applicant has amended these claims (in addition to claim 9) to overcome the objections, and requests withdrawal of these objections.

Claim Rejections Under 35 U.S.C. § 112

The Examiner rejected claims 16 and 40 under 35 U.S.C. § 112 as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. To overcome these rejections, Applicant has amended claims 16, 17-19, and 40. Applicant therefore requests withdrawal of these rejections.

Allowable Subject Matter

In the Office Action, the Examiner objected to claims 4, 6-10, 14, 15, 17-19, 23, 26-30, 34 and 35-39 as including subject matter that would be allowable if rewritten in independent form. Applicant agrees with the Examiner that these claims include allowable subject matter. Applicant does not wish to rewrite any of these claims in independent form at the present time, but reserves the right to do so at a later point if Applicant so chooses.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1-3, 5, 11-13, 24, 25, 31-33 and 41 under 35 U.S.C. 102(e) as being anticipated by Hocter 1 (US 2003-0198212) with Fleming ("Rapid Acquisition for Ultra-Wideband Localizers") for inherency. Applicant respectfully traverses the rejection and submits that these references, alone or in combination, fail to disclose each and every feature of the claimed invention, as required by 35 U.S.C. 102(e), and provide no teaching that would have suggested the desirability of modification to include such features.

Claims 1-3

With regard to amended claim 1 and claims 2-3 (which depend, either directly or indirectly, on claim 1), Hocter 1 and Fleming fail to teach or suggest arranging training symbols within a stream of information-bearing symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and the receiver, as recited by Applicant's claims 1-3, and as exemplified in the embodiments shown in FIGS. 6-8 of the present application (as examples only). In UWB systems, a set of pulses is generated from a symbol and transmitted as a UWB waveform. To aid synchronization, some conventional UWB systems (e.g., TR UWB) insert pilot pulses between each information-bearing pulses to output pulse pairs. This, for example, is shown clearly in FIG. 2 of Hocter 1 in which pilot signals are alternated with information-bearing signals. This, however, operates on the pulse level and is unrelated to arranging training symbols. Moreover, this does not ensure at least one polarity transition within every set of three consecutive training symbols at a receiver, as recited by the claim.

For example, with regard to this element in claims 1-3, the Examiner has, in the Office Action, referred to the abstract and paragraph [0001] of Hocter 1. These portions of Hocter 1, however, refer only generally to the use of a transmitted-reference, delay-hopped (TR/DH) ultra-wideband (UWB) pulse pilot signal that is sent to and used by mobile devices to acquire synchronization with the pilot signal and thereby become synchronized to the system's bit clock. This then allows the mobile devices to have their own transmission times synchronized. See paragraph [0008]. Contrary to the Examiner's assertion, Hocter 1 makes no mention of arranging training symbols within the stream of information-bearing symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and the receiver. Hocter 1 fails to disclose or suggest any arrangement of consecutive training symbols to ensure such at least one polarity transition at a receiver.

The Examiner also refers to Hocter 2 (US 2001-0053175) and Fleming with regard to this claim element of claims 1-3. Hocter 2 is incorporated by reference into Hocter 1. The Examiner has referred to Figure 1 and paragraph [0055] in Hocter 2. However, Hocter 2 does not overcome the shortcomings of Hocter 1, because Hocter 2 provides only a general disclosure that

pulse pairs in a chip will either be pulses of the same polarity or of the opposite polarity. This simply means that the pilot pulse may have the same polarity of the information-bearing pulse with which it is paired or the opposite, depending upon the information-bearing pulse. However, this does not serve to guarantee any polarity change at the receiver at all, let alone within three consecutive training symbols. For example, with TR UWB, it would be quite possible to receive a stream of pulses for which there was no polarity change in cases where the polarity of the information-bearing pulse happened to match the polarity of the pilot pulse.

Likewise, Figures 2a and 2b of Fleming, also referred to by the Examiner, do not help overcome the shortcomings of Hctor 1 and Hctor 2. These figures and corresponding text of Fleming disclose transmission of a train of doublets, where the impulses of the doublets have opposite polarity. Hctor 2 and Fleming make no mention of arranging training symbols within the stream of information-bearing symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and the receiver. These references disclose only the general concept of paired transmission pulses. Again, Hctor 2 makes clear that the polarity may vary depending upon the information-bearing symbol without any guarantee of a polarity changes between training symbols. Hctor states, for example, that when a code word of chips is used to send one data bit, then if the data bit to be sent is a one, all doublets in each chip of the code word has the polarity of the code word polarity bit. If the data bit to be sent is zero, then all doublets in each chip of the code word are transmitted with the opposite polarity of the code word polarity bit. This type of transmission scheme does not arrange training symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and the receiver. No such guarantee is achieved with the TR scheme that simply injects a training pulse every other pulse. Claims 1-3 specify that training symbols, rather than individual pulses, are used and arranged as recited. Nowhere do the cited references teach or suggest arranging training symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and receiver. Therefore, Hctor 1, Hctor 2, and Fleming, alone or in combination, fail to teach or suggest this element in claims 1-3. For at least the reasons outlined above, Applicant requests withdrawal of the rejection to these claims.

Claims 5 and 11-13

With regard to claim 5 and claims 11-13 (which depend, either directly or indirectly, on claim 5), Hocter 1 fails to teach or suggest selecting a template to be used for estimating the timing offset of a burst of the received UWB waveform, wherein the template comprises a segment of a burst of the received UWB waveform, correlating the template with a segment of a burst of the received waveform so as to form an estimate of the timing offset of the received UWB waveform, and outputting a stream of symbol estimates in accordance with the estimated timing offset. With regard to this claim element, the Examiner has, in the Office Action, referred to the abstract, Figures 1, 2, and 8, and paragraphs [0008], [0023]-[0024], and [0034] of Hocter 1. However, these figures and paragraphs of Hocter 1 fail to teach or suggest the above-recited element of claims 5 and 11-13. Although Figure 8 and paragraph [0034] of Hocter 1 discuss a form of correlation, it is a different form than that recited in these claims. Figure 8 and paragraph [0034] of Hocter 1 disclose a group of pulse-pair correlators 83₁-83_n that provide input to a code correlator 85. The output, however, of the code correlator 85 is effectively used for the generate start time signal 88 to start a transmission of data from transmitter 89 to another device, such as the base station 11. See Figure 8. Claims 5 and 11-13, however, require correlating the template with a segment of a burst of the received waveform so as to form an estimate of the timing offset of the received UWB waveform, and outputting a stream of symbol estimates in accordance with the estimated timing offset. Nowhere does Hocter 1 teach or suggest such correlation for forming an estimate of a timing offset and outputting a stream of symbol estimates in accordance with such estimated offset. Because Hocter fails to teach or suggest each and every element of claims 5 and 11-13, Applicant respectfully requests withdrawal of the rejection to these claims.

Claims 24 and 31-33

Applicant has amended independent claim 24 to incorporate the language previously recited in claim 25 (which Applicant has now cancelled). Claim 24, as amended, and claims 31-33 (which depend directly on claim 24) now require a timing synchronization unit to form an estimation of a timing offset based on the received UWB waveform by selecting a template comprising a segment of a burst of the received UWB waveform, and by correlating the template

with a segment of a burst of the received waveform, and a symbol detector to output a stream of estimate symbols based on the estimate of the timing offset. For reasons similar to those outlined above with regard to claims 5 and 11-13, Applicant submits that Hctor 1 fails to teach or suggest each and every element of claims 24 and 31-33. In the Office Action, the Examiner also referred to Figure 2 and paragraph [0027] of Hctor 3 (US 2003-0198308). Applicant submits that these portions of Hctor 3 are substantially duplicative of similar portions of Hctor 1, and add no substantive or additional value in the analysis of Applicant's claims. As a result, Applicant submits that Hctor 3 does nothing to overcome the shortcomings of Hctor 1, and therefore fails to teach or suggest each and every element of claims 24 and 31-33. For at least these reasons, Applicant requests withdrawal of the rejections to these claims.

Claim 41

Applicant has amended independent claim 41. Amended claim 41 now requires a receiver that receives the transmitted signal through a wireless communication channel, selects a segment of the received UWB waveform to use as a template, forms an estimate of the timing offset based on the correlation of the template with a segment of a burst of the received UWB waveform, and outputs a stream of estimate symbols based on the estimate of the timing offset. For reasons similar to those outlined above with regard to claims 5, 11-13, 24, and 31-33, Applicant submits that the applied references fail to teach or suggest each and every element of claim 41. For at least these reasons, Applicant requests withdrawal of the rejection to this claim.

Conclusion

As a result, Applicant submits that the cited references fail to disclose each and every limitation set forth in claims 1-3, 5, 11-13, 24, 31-33 and 41. For at least these reasons, the Examiner has failed to establish a prima facie case for anticipation of these claims under 35 U.S.C. 102(e). Withdrawal of this rejection is requested.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 20-22 under 35 U.S.C. 103(a) as being unpatentable over Miao (US 6,744,832) in view of Hctor 1 (US 2003-0198212). Applicant respectfully traverses the rejection. These references fail to disclose or suggest the inventions

defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Claims 20-22 recite a pulse generator that processes a data stream of information bearing symbols to form bursts of information bearing symbols and arranges training symbols within the stream of information-bearing symbols to ensure at least one polarity transition within every set of three consecutive training symbols at a receiver to synchronize timing of a transmitter and the receiver. For reasons similar to those outlined above with regard to claims 1-3, Applicant submits that Hootor 1, Hootor 2, and Fleming, alone or in combination, fail to teach or suggest at least this element in claims 20-22. And, as the Examiner has conceded in the Office Action, Miao fails to disclose a UWB transmission signal that includes training symbols. Therefore, for at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 20-22 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

New Claims

Applicant has added new dependent claims 42-45. These new claims are fully supported by the original disclosure, and do not introduce any new matter. As such, Applicant respectfully requests consideration and allowance of these new claims.

CONCLUSION

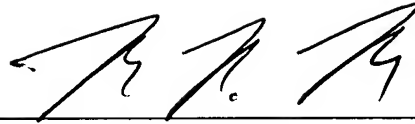
All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Although Applicant has focused the arguments above on specific claims, Applicant does not acquiesce to any of the rejections of dependent claims that are not specifically discussed. Applicant reserves further comment on any such claims, but reserves the right to present additional arguments on any of the pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date:

September 19, 2007

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By:

A handwritten signature in black ink, appearing to be 'R. Berdie', written over a horizontal line.

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